

INTERIM RECOVERY PLAN NO. 114

MT LESUEUR GREVILLEA

(GREVILLEA BATRACHIOIDES)

INTERIM RECOVERY PLAN

2002-2004

Gillian Stack and Val English



Photo Sue Patrick

January 2002

Department of Conservation and Land Management
Western Australian Threatened Species and Communities Unit (WATSCU)
PO Box 51, Wanneroo, WA 6946



FOREWORD

Interim Recovery Plans (IRPs) are developed within the framework laid down in Department of Conservation and Land Management (the Department) Policy Statements Nos. 44 and 50.

IRPs outline the recovery actions that are required to urgently address those threatening processes most affecting the ongoing survival of threatened taxa or ecological communities, and begin the recovery process.

The Department is committed to ensuring that Critically Endangered taxa are conserved through the preparation and implementation of Recovery Plans or Interim Recovery Plans and by ensuring that conservation action commences as soon as possible and always within one year of endorsement of that rank by the Minister.

This Interim Recovery Plan will operate from January 2002 to December 2004 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still ranked Critically Endangered, this IRP will be replaced by a full Recovery Plan after three years.

This IRP was approved by the Acting Director of Nature Conservation on 24 September, 2002. The provision of funds identified in this Interim Recovery Plan is dependent on budgetary and other constraints affecting the Department, as well as the need to address other priorities.

Information in this IRP was accurate at **January 2002**.

SUMMARY

Scientific Name:	<i>Grevillea batrachioides</i>	Common Name:	Mt Lesueur grevillea
Family:	Proteaceae	Flowering Period:	September – October
The Department's Region:	Midwest	The Department's District:	Moora
Shire:	Dandaragan	Recovery Team:	Moora District Threatened Flora Recovery Team

Illustrations and/or further information: Olde, P. and Marriott, N. (1995) *The Grevillea Book*. Vol. 2. Kangaroo Press, Kenthurst, NSW; Wrigley, J.W. and Fagg, M. (1989) *Banksias, Waratahs and Grevilleas: and all other plants in the Australian Proteaceae family*. Collins Publishers, NSW, Australia; Brown, A., Thomson-Dans, C. and Marchant, N. (Eds). (1998). *Western Australia's Threatened Flora*. Department of Conservation and Land Management, Western Australia

Current status: *Grevillea batrachioides* was declared to be Rare Flora in July 1992 and ranked as Critically Endangered (CR) when assessed in October 2000. It currently meets World Conservation Union (IUCN) Red List Category 'CR' under criterion D (IUCN 2000). It is only known from one population of 45 adult and 13 juvenile plants that occur over a very narrow range. The main threats are disease, inappropriate fire regimes and recreational activities.

Critical habitat: The critical habitat for *Grevillea batrachioides* comprises the area of occupancy of the known populations; areas of similar habitat ie low dense heath with emergent *Banksia tricuspis* in brown sandy loam on sandstone outcrops, within 200 metres of the known population, and additional occurrences of similar habitat that do not currently contain the species.

Habitat requirements: *Grevillea batrachioides* is confined to a very small area near Mt Lesueur in Western Australia. The species grows in low dense heath with emergent *Banksia tricuspis* on sandstone outcropping.

Existing Recovery Actions: The following recovery actions have been or are currently being implemented:

1. All relevant land managers have been informed of the species' locations and the associated legal obligations.
2. Botanic Garden and Parks Authority (BGPA) currently have 100 plants of *Grevillea batrachioides* in cultivation.
3. 113 seeds have been collected from the population and are being stored at –18°C in the BGPA's WA Seed Technology Centre.
4. Staff from the Department's Moora District office regularly monitor the population.
5. The Moora District Threatened Flora Recovery Team (MDTFRT) is overseeing the implementation of this IRP.

IRP objective: The objective of this Interim Recovery Plan is to abate identified threats and maintain or enhance *in situ* populations to ensure the long-term preservation of the species in the wild.

Recovery criteria

Criteria for success: The number of individuals within populations and/or the number of populations have increased.

Criteria for failure: The number of individuals within populations and/or the number of populations have decreased.

Recovery actions

1. Coordinate recovery actions.
2. Collect seed and cutting material
3. Conduct further surveys
4. Implement disease hygiene measures
5. Obtain biological and ecological information
6. Propagate plants for translocation
7. Undertake and monitor translocation
8. Monitor populations
9. Develop and implement a fire management strategy
10. Promote awareness
11. Include recommendations for *Grevillea batrachioides* in Management Plan for the Park
12. Write a full Recovery Plan

1. BACKGROUND

History

The type specimen of *Grevillea batrachioides* was collected by James Drummond apparently in the Pallinup River area between 1850 and 1851. Until recently, *Grevillea batrachioides* was presumed to be extinct as no other specimens of the taxon had ever been collected. An unidentified specimen collected by E. A. Griffin in 1982 was recognised as *Grevillea batrachioides*. The population from which this collection had been made was relocated within Lesueur National Park in 1991, and despite many searches in areas of what appeared to be suitable habitat no other populations have been located.

Description

Grevillea batrachioides is a bushy shrub to 2 m tall with rounded, hairy branchlets and stiff leaves, which are divided into 3-5 narrow lobes. These may be further unequally divided. The leaf, which is about 1.5 cm long, has spreading hairs beneath and is rolled under, leaving only the midrib exposed. The red flowers are in simple inflorescences about 5 cm long at the ends of the branchlets. Each flower is on a stalk 12-13 mm long. The flower, 3.5-4 mm across, is dilated at the base and is hairy outside, with a few hairs on the inside. The ovary is also hairy. *G. batrachioides* flowers in September to October.

Grevillea batrachioides is closely related to *Grevillea asparagoides*, which has shorter flower stalks and longer leaves. It has been suggested that *Grevillea batrachioides* and *G. maxwellii* should be treated as sub-species of *G. asparagoides*.

Distribution and habitat

Grevillea batrachioides grows only in the Lesueur area where it is found on flat sandstone outcrops in brown sandy loam on a north-west facing slope below a breakaway. Associated vegetation is dense heath with open woodland of mallee and *Banksia tricuspis*.

Critical habitat

Critical habitat is habitat identified as being critical to the survival of a listed threatened species or listed threatened ecological community. Habitat is defined as the biophysical medium or media occupied (continuously, periodically or occasionally) by an organism or group of organisms or once occupied (continuously, periodically or occasionally) by an organism, or group of organisms, and into which organisms of that kind have the potential to be reintroduced (Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*).

The critical habitat for *Grevillea batrachioides* comprises:

- the area of occupancy of the known populations,
- areas of similar habitat ie. flat sandstone outcrops in brown sandy loam on north-west facing slopes below breakaways, within 200 metres of known populations (these areas provide potential habitat for natural range extension),
- additional occurrences of similar habitat ie. flat sandstone outcrops in brown sandy loam below breakaways, that do not currently contain the species (these areas represents possible translocation sites).

Biology and ecology

Very little is known about the biology and ecology of *Grevillea batrachioides*. The area in which the population occurs was burnt in 1985, and the species was recorded from there again in 1991. Therefore the plants must have regenerated from seed and/or root stock following the fire. Notes on a 1991 collection by P.M Olde and J. Cullen (collection number 03319636, WA herbarium) states that the species is not lignotuberous. Therefore the species is likely to reproduce from seed.

It is likely that the species does not require fire to stimulate germination, as juvenile plants have appeared in the population in the absence of fire (²R. France personal communication).

The species is easily propagated from seed and cuttings (³A. Shade personal communication).

Olde and Marriot (1995) state that the species is almost certainly pollinated by birds.

Threats

¹ Rick France: Ranger in Charge, Nambung National Park

² Amanda Shade: Propagator, Botanic Gardens and Parks Authority

Grevillea batrachioides was rediscovered in 1991 and declared to be Rare Flora in 1992. It currently meets World Conservation Union (IUCN) Red List category ‘Critically Endangered’ under criterion D (IUCN 2000) as it is only known from one population of 45 adult and 13 juvenile plants that occur over range of less than a few hundred metres. The main threats are disease, inappropriate fire regimes and recreational activities.

- **Disease** could be a serious threat to *Grevillea batrachioides*. Dieback, caused by the plant pathogen *Phytophthora cinnamomi*, is known from Lesueur National Park. This pathogen causes the roots to rot and results in death from drought stress. It is suspected that *Grevillea batrachioides* is susceptible to the disease. Changes in the structure of the habitat caused by dieback, such as decreasing the shade afforded by the shrub layer, may also impact the *Grevillea batrachioides* population. The disease is not recorded from the habitat, however, and as this is the only known population in the wild, preventing the introduction, spread or amplification of the impacts of the disease in the population is very important.
- **Inappropriate fire regimes** may affect the viability of populations. As mentioned, the species is able to regenerate following fire, presumably from seed. Too frequent fire may therefore result in the depletion of the soil seed bank if fires recur before regenerating or juvenile plants reach maturity and replenish the soil seed bank. Occasional fires may, however, stimulate the germination of soil-stored seed. As the species is currently only known from a very narrow range, fire must be prevented from destroying the only known population before a soil seed bank is likely to have been established.
- **Recreational activities** are a potential threat to *Grevillea batrachioides*. As the species occurs in a scenic area in a National Park, there is potential for plants to be trampled by recreational users or for visitors to introduce dieback into the habitat.

Summary of population information and threats

Pop. No. & Location	Land Status	Year / No. plants	Condition	Threats
1. Lesueur	National Park	1991 9 (1) 1992 9 1994 10 1998 15 (4) 1999 17 2001 45 (13)	Healthy	Disease, inappropriate fire regimes, recreational activities

Numbers in brackets = number of seedlings.

Guide for decision-makers

Section 1 provides details of current and possible future threats. Developments in the immediate vicinity of the population or within the defined critical habitat of *Grevillea batrachioides* require assessment. No developments should be approved unless the proponents can demonstrate that they will have no significant impact on the species, or its habitat or potential habitat.

2. RECOVERY OBJECTIVE AND CRITERIA

Objective

The objective of this Interim Recovery Plan is to abate identified threats and maintain or enhance *in situ* populations to ensure the long-term preservation of the species in the wild.

Criterion for success: The number of individuals within populations and/or the number of populations have increased.

Criterion for failure: The number of individuals within populations and/or the number of populations have decreased.

3. RECOVERY ACTIONS

Existing recovery actions

Relevant land managers are aware of the Critically Endangered status of the species and its locations.

One plant was grown from seed, and another 12 from cuttings in 1994. Botanic Gardens and Parks Authority (BGPA) currently have 100 plants of *Grevillea batrachioides* in cultivation, with 10 of these being derived from the plant grown from seed. The strike rate for cuttings is generally good (A. Shade personal communication). Strike rates and grafting success of cuttings for a selection of the material is as follows:

Number of Cuttings	Rooting results	No grafted	Grafts struck
5	20%	3	Nil
12	16%	4	1
20	50%	4	Nil

66 seeds were collected from 21 plants in 1998 and another 53 seeds collected in 1999 by staff from BGPA. These are stored at -20°C at the WA Seed Technology Centre at the BGPA.

Staff from the Department's Moora District office regularly monitor the population.

The Moora District Threatened Flora Recovery Team (MDTFRT) is overseeing the implementation of this IRP and will include information on progress in its annual report to the Department's Corporate Executive and funding bodies.

Future recovery actions

Where populations occur on lands other than those managed by the Department, permission has been or will be sought from the appropriate land managers prior to recovery actions being undertaken.

1. Coordinate recovery actions

The MDTFRT will continue to oversee the implementation of recovery actions for *Grevillea batrachioides* and will include information on progress in their annual report to the Department's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: The Department (Moora District) through the MDTFRT
Cost: \$800 per year.

2. Collect seed and cutting material

Preservation of germplasm is essential to guard against extinction if wild populations are lost. There are currently only low numbers of seeds in storage, as seed set is low and the amount available for collection each year is very limited. Seed and cutting collections are also needed to propagate plants for translocations.

Action: Collect seed and cutting material
Responsibility: The Department (Moora District) through the MDTFRT
Cost: \$3,700 in first and second years.

3. Conduct further surveys

Community-based groups and individuals will be encouraged to be involved in further surveys supervised by the Department's staff during the species' flowering period (September-October). One possible search area is the Pallinup River, apparently the site of J. Drummond's type collection. Similar habitat in areas near the present population, such as within Lesueur National Park appear more likely, however.

Action: Conduct further surveys
Responsibility: The Department (Moora District) through the MDTFRT
Cost: \$4,200 per year.

4. Implement disease hygiene measures

It is necessary to maintain disease hygiene measures, to reduce the likelihood of introducing or amplifying the impacts of the disease in the habitat of *Grevillea batrachioides*. Access to the area will be restricted, especially when the soil is moist. Signs advising of the dieback risk will be posted at the population.

Action: Implement disease hygiene measures
Responsibility: CALM (Moora District) through the MDTFRT

Cost: \$1,500 in the first year.

5. Obtain biological and ecological information

Increased knowledge of the biology and ecology of the species will provide a scientific basis for management of *Grevillea batrachioides* in the wild. Investigations will include:

1. Investigation of the reasons for low seed production - whether this is due to a lack of pollinators, possibly because there are too few additional sources of pollen available at the same time; competition in the thick vegetation of its habitat; low production of pollen/flowers; low production of fruit; or the low level of genetic diversity.
2. Study of the soil seed bank dynamics and the role of various factors including disturbance (such as fire), competition, rainfall and grazing in recruitment and seedling survival.
3. Determination of reproductive strategies, phenology and seasonal growth.
4. Investigation of the mating system and pollination biology.
5. Investigation of population genetic structure, levels of genetic diversity and minimum viable population size.

Action: Obtain biological and ecological information
Responsibility: The Department (Science Division, Moora District) through the MDTFRT
Cost: \$18,800 per year.

6. Propagate plants for translocation

The propagation of plants in readiness for translocation is essential as the only known wild population of *Grevillea batrachioides* is very small, occurs over a very narrow range and is highly vulnerable to particular threats such as too frequent fire, disease or trampling. Seed and/or cuttings will be taken for germination and propagation by the BGPA for use in translocations.

Action: Propagate plants for translocation
Responsibility: The Department (Moora District) and the BGPA through the MDTFRT
Cost: \$2,800 in the first and second years.

7. Undertake and monitor translocation

Although translocations are generally undertaken under full Recovery Plans, the vulnerability of the single small population of this species in the wild indicates the need for development of a Translocation Proposal within the time frame of this IRP. This will be coordinated by the MDTFRT. Information on the translocation of threatened animals and plants in the wild is provided in CALM Policy Statement No. 29 *Translocation of Threatened Flora and Fauna*. All Translocation Proposals require endorsement by the Director of Nature Conservation.

Monitoring of the translocation is essential and will be undertaken according to the timetable to be set out in the Translocation Proposal.

Action: Undertake and monitor translocation
Responsibility: The Department (Moora District, Science Division) through the MDTFRT
Cost: \$13,300 in first year and \$6,200 in subsequent years.

8. Monitor populations

Annual monitoring of factors such as habitat degradation (particularly the impacts of drought, and dieback), population stability (expansion or decline), pollinator activity, seed production, recruitment, longevity and predation is essential. Monitoring may indicate the need to stimulate pollination and germination, as seed production is very low (³L. Sweedman personal communication).

Action: Monitor populations
Responsibility: The Department (Moora District) through the MDTFRT
Cost: \$2,200 per year.

³ Luke Sweedman: Seed Collector, Botanic Gardens and Parks Authority

9. Develop and implement a fire management strategy

If the species reproduces from seed then too frequent fire is likely to prevent the accumulation of sufficient soil-stored seed to allow regeneration of the population. A fire management strategy will be developed to determine fire control measures and appropriate timing and frequency of fire. The low rate of seed production will need to be taken into account when determining the recommended fire frequency.

Action: Develop and implement a fire management strategy
Responsibility: The Department (Moora District) through the MDTFRT
Cost: \$2,500 in first year and \$1,000 in subsequent years.

10. Promote awareness

The importance of biodiversity conservation and significance of the conservation of the Critically Endangered *Grevillea batrachioides* will be promoted to the public. Awareness will be encouraged in the community through a publicity campaign through the local print and electronic media and poster displays. Formal links with local naturalist groups and interested individuals will also be encouraged. An information sheet, which includes a description of the plant, its habitat type, threats, management actions and photos will be produced.

Action: Promote awareness
Responsibility: The Department (Moora District, Strategic Development and Corporate Affairs) through the MDTFRT
Cost: \$1600 in first year and \$900 in subsequent years.

11. Include general recommendations for *Grevillea batrachioides* in Management Plan for Park

The general management recommendations for *Grevillea batrachioides* will be included in the Management Plan for the Lesueur National Park. This will include recommendations on management of recreational activities near the population, dieback, fire management and monitoring.

Action: Include management recommendations in Management Plan for Park
Responsibility: CALM (Moora District) through the MDTFRT
Cost: \$500 in the third year.

12. Write a full Recovery Plan

At the end of the second-year of implementation of this IRP, the need for further recovery will be assessed. If *Grevillea batrachioides* is still ranked Critically Endangered at that time a full Recovery Plan will be developed that prescribes actions required for the long-term recovery of the species.

Action: Write a full Recovery Plan
Responsibility: The Department (WATSCU, Moora District) through the MDTFRT
Cost: \$20,700 once in the final year.

4. TERM OF PLAN

This Interim Recovery Plan will operate from January 2002 to December 2004 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still ranked Critically Endangered, this IRP will be replaced by a full Recovery Plan after three years.

5. ACKNOWLEDGMENTS

The following people have provided assistance and advice in the preparation of this Interim Recovery Plan:

Anne Cochrane	Manager, the Department's Threatened Flora Seed Centre
Greg Keighery	Senior Research Scientist, Science Division of the Department
Amanda Shade	Horticulturist, BGPA
Luke Sweedman	Seed collector, BGPA

Thanks also to staff of the WA Herbarium for providing access to Herbarium databases and specimen information, and The Department's Wildlife Branch for assistance.

6. REFERENCES

- Department of Conservation and Land Management (1992) Policy Statement No. 44 *Wildlife Management Programs*. Department of Conservation and Land Management, Western Australia.
- Department of Conservation and Land Management (1994) Policy Statement No. 50 *Setting Priorities for the Conservation of Western Australia's Threatened Flora and Fauna*. Department of Conservation and Land Management, Western Australia.
- Department of Conservation and Land Management (1995) Policy Statement No. 29 *Translocation of Threatened Flora and Fauna*. Department of Conservation and Land Management, Western Australia.
- IUCN (2000) *IUCN red list categories prepared by the IUCN Species Survival Commission, as approved by the 51st meeting of the IUCN Council*. Gland, Switzerland.
- Olde, P. and Marriott, N. (1995) *The Grevillea Book*. Vol. 2. Kangaroo Press, Kenthurst.
- Patrick, S. and Brown, A.P. (2001). Declared Rare and Poorly Known Flora in the Moora District. Wildlife Management Program No. 28. Department of Conservation and Land Management, Perth.
- Western Australian Herbarium (1998) FloraBase – Information on the Western Australian Flora. Department of Conservation and Land Management, Western Australia. <http://www.calm.wa.gov.au/science/>
- Wrigley, J.W. and Fagg, M. (1989) *Banksias, Waratahs and Grevilleas: and all other plants in the Australian Proteaceae family*. Collins Publishers Australia, NSW.

7. TAXONOMIC DESCRIPTION

Olde, P. and Marriott, N. (1995) *The Grevillea Book*. Vol. 2. Kangaroo Press, Kenthurst.

***Grevillea batrachioides* F. Mueller ex D.J. McGillivray** is a bushy **shrub** to 2m. **Branchlets** angular to terete, tomentose. **Leaves** 1-4cm long, ascending to spreading, +/- sessile, crowded, deeply and divaricately 1-3 times divided; rachis refracted: leaf lobes 3-20 mm long; 1 mm wide, narrowly linear, rigid, pungent, secondary lobes occasionally of unequal length; upper surface sparsely pubescent, soon glabrous, midvein conspicuous; margins angularly refracted about an intramarginal vein to midvein; lower surface obscured, silky in grooves, midvein prominent. **Conflouescence** 2-5 cm long, erect to decurved, unbranched, terminal, hemispherical and partially secund, loose, peduncle and rachis pubescent, bracts 1 mm long, broadly ovate, pubescent, persistent to antithesis. **Flower colour**: perianth pale pink to creamy pink with richer pink overtones; style deep red. **Flowers** acroscopic: pedicels 7-15 mm long, glandular-villous; torus 1.5 mm across, straight or slightly oblique; nectary prominent, V-shaped, lipped, cup-like; **perianth** 7-11 mm long, 3.5-5 mm wide, ovoid, grossly saccate, sharply narrowed at neck, openly tomentose outside, glabrous inside except a few trichomes on attenuated segment of tepals, cohering except along dorsal suture, partially exposing style end before antithesis; limb revolute, globular, vilous; **pistil** 30-38 mm long; ovary sessile villous; style elongate, first exerted near curve on dorsal side and looped upwards, glabrous at base and apex, otherwise sparsely glandular-pubescent, dilating into style end; pollen presenter oblique, elliptic, flat, umbonate. **Fruit** 17-23 mm long, 9-10 mm wide, 6 mm deep, erect, ellipsoidal but attenuate, flattened, dorsally ribbed, tomentose with reddish striping; pericarp 0.5 mm thick at suture. **Seed** 11.5 mm long, 3.5 mm wide; ellipsoidal; outer face smooth; margin revolute with a narrow waxy or papery border; inner face smooth, channelled near rim.